

REMARKS

Favorable reconsideration is respectfully requested in view of the foregoing amendments and following remarks.

Claim 1 has been amended to conform to the restriction requirement. Specifically, the claims have been amended to delete the proviso wherein R¹, R² or R³ are a heterocyclic group. There is no provision in the claim for R¹, R² or R³ to be a heteroaryl, so no amendment to address this aspect of the restriction requirement is deemed necessary. Claim 1 has been further amended to include the proviso that R¹, R² and R³ are not substituted with a heterocyclic or heteroaryl ring. The claim has further been amended to include the proviso that R¹ and R² are not combined to form a heterocyclic or heteroaryl ring, and the proviso that R² and R³ are not combined to form a heterocyclic or heteroaryl ring.

In view of the foregoing amendments, it is respectfully submitted that the claim has been limited to the elected subject matter.

Claim 1 has been further amended to more specifically define the method as comprising contacting an enamine of formula (1) with hydrogen and a transition metal complex to produce the optically active β -amino acid of formula (2). Claims 4, 5, 10, 11 and 12 have accordingly been cancelled. Claims 2, 3, 6, 7 and 9 have been amended as necessary. New claims 13 and 14 have been added to more specifically define the transition metal complex, according to the specification at page 20, lines 1-9.

Claims 1-12 are rejected under 35 USC 112, first paragraph, as failing to comply with the written description requirement, on the basis that the claim is not limited to essential starting materials hydrogen, acid and catalyst.

Claim 1 has been amended to include as an essential starting material hydrogen and a transition metal complex catalyst. The requirement to add a starting material acid is respectfully traversed.

An acid is not an essential feature of the claimed invention, but is an optional feature. This is clear from the disclosure, for example on page 28, lines 3-9. Note the use of the term

"preferably" on line 4 as well as the description on line 9 wherein "the acid may be added only when it is desired". Note that the enamine of formula (3) and formula (4) are described on page 17 of the specification as being encompassed by the formula (1) of claim 1. Please also note the Working Examples 2 and 3 on pages 37-38 of the specification show that the method of the claimed invention can be carried out quite satisfactorily without the use of the acid. Note that Example 1 describes the claimed method using an acid, whereas Examples 2 and 3 contain no acid.

In view of the foregoing, it is respectfully submitted that this rejection has been overcome.

Claims 1-12 are further rejected under 35 USC 112, first paragraph, on the basis that another starting material, copper chromite, is required for enablement of the claim.

The Applicant's representative acknowledges with thanks the Examiner's clarification of this ground of rejection in the telephone interview held July 5, 2005. During the discussion, the Examiner clarified that this ground of rejection was not requiring copper chromite, which compound is not mentioned in present specification, as a starting material. Instead, this ground of rejection is intending to generally state that the claims are not enabled without incorporation of all essential starting materials in claim 1.

It is respectfully submitted that the claims as amended now require all essential starting materials, for the reasons set forth in the foregoing discussion with respect to the written description rejection.

Accordingly, this ground of rejection is deemed to be overcome.

On page 8, the Examiner has required that the transition metal complex of formula (7) or (8) be incorporated into claim 1. This position is respectfully traversed.

It is respectfully submitted that the incorporation of a transition metal complex limitation into claim 1 as a required material is sufficient to distinguish the claimed invention from the known prior art. The transition metal complex used as an essential element in the present invention is described in detail beginning on page 19, line 24 to page 27, line 22. The transition metal complexes of formula (7) or (8) are merely preferred embodiments.

Accordingly, it is respectfully submitted that one skilled in the art would be capable of practicing the claimed invention using transition metal complexes including but not limited to those defined by formula (7) or (8) without undue experimentation.

Accordingly, it is respectfully submitted that this ground of rejection has been overcome.

On page 8, claims 1-12 are rejected under 35 USC 112, second paragraph, on the basis that the recitation "an asymmetric hydrogenation" is ambiguous. This phrase has been removed from the claims and is clarified by reciting that the enamine of formula (1) is contacted with hydrogen.

Accordingly, this ground of rejection is deemed to be overcome.

It is further noted that the Examiner appears to take the position on page 9, line 3 of the Action that an alcohol is an essential starting material. Use of an alcohol in the claimed method is described in the specification at page 30, line 12 to page 31, line 20. Specifically, please note the description on page 30, lines 12-13, where it is stated that the method of the present invention can be carried out in a solvent when it is needed.

On page 10, claims 1-12 are rejected under 35 USC 103 as unpatentable over Fuchs's in view of Berlingozzi et al., and Gazzetta Chimica Italiana. This ground of rejection is respectfully traversed.

According to the Examiner's rejection, the difference between the prior art and the claimed invention resides in the definition of the variant R² of the starting compound (1). This is correct.

Difference in the catalyst

As a result of the foregoing amendments, there is now another difference between the prior art and the claimed invention, i.e. the catalyst. In the prior art reference Fuchs, platinum, palladium or rhodium catalysts in particular supported catalysts are employed (Fuchs, column 2, lines 7-14). On the other hand, in the claimed invention, a transition metal complex is used as the catalyst. There is neither mention nor suggestion of a transition metal complex catalyst in the prior art reference of Fuchs or Berlingozzi et al. This difference also makes the following structural difference in the reaction product.

Difference in the reaction product

The method of the prior art reference of Fuchs produces the end product in the form of the racemic mixture (a non optically active product). The direct reaction mixture is a racemic mixture. This is quite apparent from the Examiner's Official Action page 11, lines 5-6 stating "Fuchs silence the optically enantiomer of the compound of formula (I)", as well as the symbol (RS) in the Working Examples 1 to 3 of Fuchs. Thus, in order to produce an optically active product, the method of production by Fuchs must be followed by a resolution of the racemate, as apparent from the Office Action on page 11, lines 10-20. This method thus requires one additional step of resolution of the racemate essential. This is a drawback of the prior art reference invention as compared with the claimed invention. Furthermore, as the racemate of Fuchs must be resolved into two different optical products by the use of chromatography, the yield of the target optically active product is inevitably and theoretically less than 50%, which is considerably low.

On the other hand, the method of the claimed invention directly produces the optically active product of the formula (2) and does not need use of chromatography for the purpose of resolution of a racemate. Namely, the method of the claimed invention operates without chromatography for resolution of a racemate. This is apparent from amended claim 1 as well as the specification at page 8, second full paragraph. The direct production of the optically active product by the claimed method is free from the above-mentioned drawback of the prior art reference invention wherein the yield of the optically active product is theoretically less than 50%.

The direct production of optically active product in the present invention is also proved by the Declaration of Mr. Matsumura submitted concurrently herewith. Please note that the Declaration contains Experiment parts 1 to 4, wherein parts 1 to 3 are the same as the Working Examples 13 to 15 disclosed in the present specification, and Experiment part 4 is another example embodying the claimed invention. The Examiner will notice from the Declaration that

the claimed invention can directly produce the optically active product without the use of chromatography.

It should also be noted that the Working Examples 1 to 12 and 16 of the specification refer to silica gel chromatography. However, the chromatography in those examples are simply used as a standard purification step of reaction products. On the other hand, tartaric acid in the prior art reference of Berlinogozzi et al. is used for the resolution of a racemate, which is common knowledge of those skilled in the art.

It is evident from the Declaration of Mr. Matsumura that the claimed invention does not require the usage of chromatography as an essential feature to obtain the optically active compound. Chromatography can nevertheless be optionally used in the method of the claimed invention.

In summary, the above-mentioned differences between the prior art references and the present invention as amended would be quite unobvious to those skilled in the art.


Accordingly, reconsideration and withdrawal of the rejection is respectfully solicited.

Lastly, on page 12 of the Action, claims 1-12 are objected to as containing non-elected subject matter. This ground of rejection is deemed to be overcome in view of the foregoing amendments.

In view of the foregoing, it is respectfully submitted that each ground of rejection set forth in the Official Action has been overcome, and that the application is now in condition for allowance. Accordingly, such allowance is solicited.

Respectfully submitted,

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